



PATENT SPECIFICATION

286,932

Application Date: Sept. 8, 1928. No. 15,013/27.

Complete Left: June 7, 1927.

Complete Accepted: March 5, 1928.

PROVISIONAL SPECIFICATION.

Improvements in Optical Apparatus for Avoiding the Effects of Dazzle of Motor Vehicle Lamps and the like.

I, HAROLD DENNIS TAYLOR, of "Hillcrest", Cowpasture Road, Ilkley, in the County of York, a British subject, do hereby declare the nature of this invention to be as follows:—

The present invention relates to optical apparatus for the prevention of the effects of dazzle by the lamps of automobile vehicles and the like.

White light or daylight may be regarded as being composed of six coloured constituent lights, viz.: Red, orange, yellow, green, blue and violet intermingled. These colour sensations depend upon the wave length of each sort of light, and it can be seen from a curve of visual luminosity that the luminous effect upon the average human eye of the yellow-green rays is a maximum, whilst the luminous effect of the dark red or violet rays is a minimum.

Now there are certain coloured glasses or stained gelatine or celluloid films available, which if white light is passed through them have the property of allowing a certain proportion of a well defined part of the spectrum to pass, whilst the other parts are more or less completely absorbed. For instance an orange-red or red glass is available which transmits only that part of the spectrum from red partly into the green, whilst there is also a blue glass which is available which transmits blue light partly into the green. Each of these two glasses transmits a range of coloured light which is scarcely passed at all by the other. That is to say, that if white light were passed through both of these glasses in sequence practical darkness would result.

If the extent of the spectrum passed by say the blue glass is sufficiently increased towards the yellow, so that it partly overlaps the red glass curve of luminous effect, it will be clear that if white light is passed through such modified blue and red glass in succession then a very small percentage of green and yellow-green light corresponding to where the luminosity curves overlap will be transmitted and partial or relative darkness alone will result. Such pieces of supplementary coloured glass celluloid or the like may

[Price 1/-]

be called "mutually exclusive coloured filters" or "partially exclusive coloured filters" according to the degree of darkness resulting from transmission of the light through both filters.

The screens of the invention may either be made up (a) in the form of spectacles to be worn by a person or again may be in the form of a screen to be clipped or fixed to the wind-screen of a motor vehicle, or again (b) may be formed as colour selective or obdurate discs or segments adapted to be swung into the light path of the head lights of an automobile vehicle. In practice these devices (a) and (b) will be used in conjunction with one another.

According to the present invention a screen is formed of at least two portions of glass, celluloid gelatine, or the like translucent material, stained or coloured, or of such property that these portions respectively only pass through light supplementary to the coloured light passed by the other portion or pass light partially supplementary thereto.

In the arrangement as applied to a pair of spectacles, a spectacle frame of any usual form may contain in each eyeframe a pair of segments, semi-circular or substantially so, one of which may for instance, be of blue or blue green glass, whilst the other is of red glass, and these blue and red glass segments may be either such as to almost totally absorb that light region of the spectrum passed by the other segment or may absorb such other light region to a partial extent. If desired, a translucent portion may be arranged between, or at one side of these blue and red glass segments, which translucent portion may be either an open aperture or may be a piece of white glass.

Should the wearer also need correction to his eyesight, then the coloured segment, if of glass, may be shaped into suitable spectacle lenses giving the optical correction required by the wearer. If such spectacles are worn not too closely to the eyes by the driver of the motor vehicle, then it is perfectly easy by slight variations in the inclination of the head to look at another car facing him through either

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the blue glass or the red glass, or again through the space between them.

A screen of this form may be arranged in a frame to be clipped on the wind-screen of an automobile vehicle or again a portion of this wind-screen may be coloured or provided with coloured glass celluloid, gelatine or the like sheets arranged in this manner. Or such coloured screens may be interposed before the driver's eyes automatically whenever the similarly coloured screens are swung in front of his headlights.

Again in the application to the headlights of an automobile vehicle in a preferred form rotary screens of supplementary selective coloured glasses or films adapted to be mechanically or electrically operated by a remote control on the driver's seat of the vehicle can be provided with three glass portions adapted to obdurate wholly or partially the light from the lamp. One portion may be of ordinary white glass or a space left vacant whilst the other two portions are of red and blue glass respectively, which portions as above stated, may be either wholly or partially supplementary and exclusive to one another as regards the light which they pass.

It will consequently be seen that if the drivers of automobile vehicles provide themselves with spectacles constituted according to the present invention, or with some form of fixed or rotary screen arranged in their line of vision, which can for instance, be conveniently mounted on their own wind-screen and if again the automobiles are provided with similar screens used in conjunction with head lamps, that where two automobile vehicles are meeting at night one would on seeing the other, colour the lights of his head lamps by means of one pair of his screens. Supposing A swings the blue screens over his headlights, then the person B who is driving in the opposite direction to him would require to swing the red screens over his head lights and look at A through the red portion of his spectacles or screen, and consequently, the lights of the on-coming vehicle would appear to either A or B to be either wholly extinguished or partially obscured, whereas the ground between the automobile vehicles and the vehicles themselves would still appear to each person A and B to be illuminated by his own head lamps, whilst each would see the others headlights so greatly subdued that any dazzling effect would be completely avoided.

For when the driver A looks at the

headlights of B's automobile through the blue segments of his spectacles or his blue screen whilst B's headlights are shining through B's red lamp screens, it will be just the same as if A were looking at B's naked white headlights through red and blue glasses superimposed, that is to say, giving almost total darkness, but A's view of B's vehicle, and of the roadside objects illuminated by his own coloured headlights is only slightly obscured by his viewing them through glass of the same colour (blue in this case) as that of the light from his own headlights, which is illuminating them. Obviously A's blue spectacles almost freely pass the blue light reflected from the surface of B's vehicle and from surrounding objects that has originated from A's blue screened headlights. Conversely, B regards A's blue headlights through his own red spectacles, and therefore, sees A's headlights more or less extinguished, whilst the red light reflected from A's vehicle, and the surrounding objects that has originated from B's red screened headlights, is readily seen by B through his red spectacles and thus the usual dazzling effect is eliminated for both drivers.

The practical use of the apparatus will thus be seen to consist in the mutual co-operation of two or more drivers of motor vehicles meeting on a road when travelling in opposite directions, and needs no other rule than the very simple one, that which ever colour of light is first displayed by one driver calls for the display of the other supplementary colour by the other driver. If one driver A first turns on red light when meeting two or more drivers, B, C and D, then naturally C and D as well as B will also respond by showing their blue lights. The procedure will become after a little practice, so simple as to be automatic and instinctive.

If desired, means may be provided to temporarily increase the candle power of the head lamps of the car simultaneously with the bringing into action of the red or blue screens, in order to compensate for the perceptible reduction in the luminosity of the utilized filtered light which unavoidably accompanies the use of the coloured spectacles or screens and the coloured lamp screens.

Dated this 2nd day of June, 1927.

W. P. THOMPSON & Co.,
12, Church Street, Liverpool,
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COMPLETE SPECIFICATION.

Improvements in Optical Apparatus for Avoiding the Effects of Dazzle of Motor Vehicle Lamps and the like.

I, HAROLD DENNIS TAYLOR, of "Hillcrest", Cowpasture Road, Ilkley, in the County of York, a British subject, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The present invention relates to optical apparatus for the prevention of dazzle by the lamps of automobile vehicles and the like.

It has previously been suggested, as a means for eliminating the blinding effects of the head lamps of vehicles, to arrange head lamps on the vehicle capable of projecting two lights of complementary colours and to mount displaceable screens on the vehicle for screening the driver's eyes from light of other colours, while admitting light of the projected colour to his eyes. It has also been suggested to mount two colour screens in spectacle frames for personal wear. In one example the lamps could emit either red or blue-green light while red and blue green screens were mounted on the vehicle. In a second case either yellow or blue light was projected and similar yellow and blue screens were mounted on the vehicle. It has also been proposed to incorporate switching mechanism for increasing the power of the light source when a light of the darker colour is used.

In my Patent Specification No. 283,608 I describe and claim certain light screening arrangements adapted for use in the avoidance of dazzle by the lights of vehicles utilising three separate panels or screens, one transparent to white light, one to red light, and one to blue-green light, including their mounting in a spectacle frame.

According to the present invention an eye screening arrangement for personal wear adapted for use in the avoidance of dazzle by the lights of vehicles, includes a screen or panel transparent only to light substantially blue green and a screen or panel transparent only to light substantially red, mounted in a spectacle frame, characterised by the feature that the bridge of the frame is displaced back from the plane of the screen or panel.

A further feature of the invention consists in providing additional screens or panels transparent and/or opaque to white light.

White light may be regarded as being composed of six different coloured constituents viz.:—Red, orange, yellow, green and blue and violet.

These colour sensations depend on the wave length of the light and coloured glasses and stained films are available which transmit certain well defined regions of the spectrum and more or less completely absorb all other colours. For example, an orange-red or red glass is available which transmits only that portion of the spectrum from red partly into the green while there is also a blue- or blue-green glass available which transmits from the violet partly into the green. Each of these filters transmits a band of colour which is scarcely transmitted at all by the other. That is to say, if the two filters are placed one behind the other they are almost completely opaque to light.

If the range of the spectrum transmitted by the blue glass is sufficiently extended towards the yellow, so that it partly overlaps the range transmitted by the red glass, or vice versa, it is seen that if white light falls on such modified blue and red glass in succession, then a very small percentage of the green and yellow-green light corresponding to the overlapping of the transmitted regions will be transmitted, but the amount will be small. The intensity of the transmitted light depends on the amount of overlap and on the thickness of the filters.

The colour filters or screens are made in the form of spectacles or eye glasses to be worn by road users and as discs or segments adapted to be placed in front of the lamps of the vehicle.

These screens are used in conjunction with one another to secure immunity from the dazzling effect of the lamps of an approaching vehicle. The following is a particular illustration of the use of the present invention.

Two vehicles, A and B, meeting at night, are each provided with a substantially similar set of colour screens, the drivers also being provided with spectacles containing red and blue-green filters of substantially the same kind. If A has his blue or blue green lamp filter in use, projecting blue light, then B responds by inserting his red lamp filter. A looks at B through the blue portion of his spectacles and B views A through his red

portion. The red light from B's lamps is almost entirely or completely absorbed by the blue glass of A's spectacles, but the blue light from A's own lamps, reflected from B's vehicle is transmitted freely, so that A sees B in the light of his own lamps, little or none of the light from B's lamps reaching A's eyes. In the same way, the blue light from A's lamps is prevented from dazzling B by the red portion of B's spectacles, through which B is looking while B still sees A's vehicle by the red light from his own lamps. That is, each driver views the other's lamps through crossed colour filters. The only rule needed is that whatever colour of light is first displayed by one driver, the other displays the opposite colour, and looks through the portion of his spectacles of the same colour as his own lights.

The spectacles are adapted for use with two forms of the light screening apparatus which may be called the two light system, and the three light system respectively. In the two light system vehicles are provided with a lamp or lamps combined with a suitable arrangement of colour screens or colour filters so that red or blue-green light may be projected at will. Road users observe the lights through red and blue-green filters similar to those in the lamps.

In the three light system vehicles are provided with a lamp or with lamps combined with a suitable arrangement of colour filters or colour screens so that white, red or blue-green light may be projected at will. The white is for normal use, the red or blue green for use when meeting other vehicles. Road users wear spectacles containing blue green and red filters similar to those in the lamps together with a clear panel through which the wearer normally looks.

Various types of spectacles for use according to the present invention are illustrated in the accompanying drawings:—

Figures 1, 2, 3 and 4 show the preferred form of frame construction.

Figure 5 is a diagram indicating the amount of head movement necessary.

Figures 6, 7 and 9 show possible arrangements of the colour filters in the frames and

Figure 8 shows in section the protection and mounting of the colour filters, and also their combination with lenses when the sight of the wearer needs correction.

The frame of the spectacles may be made of any suitable material, metal, celluloid, or tortoiseshell, and has the bridge 68 brought back about half an inch behind the plane of the filters, so placing the latter about half an inch further from

the eyes than is usual. Referring to Figure 5, the pupil of the eye 70 is about 1 inch from the filter and the centre of the eye ball 69 is about 1.5 inches from the filter. If the pupil is considered fixed, while the upper portion of the spectacles contains a blue-green filter 61 and the lower section a red filter 62, as shown in Figure 1 then each coloured section subtends an angle γ_1 of approximately 26° at the pupil, while the middle portion 65, filled with clear and/or opaque glass, subtends an angle γ_2 of approx. 24° .

If the wearer tilts his head forward by $17\frac{1}{2}^\circ$, the eyes looking straight ahead, then the wearer is looking through the centre of the blue-green section, while if the head is raised $17\frac{1}{2}^\circ$ the eyes looking horizontally, the wearer looks through the lower red section. Due to the fact that the axis of rotation of the eye-ball 69 is about half an inch further back from the filter than the pupil, the greatest angular inclination of the head necessary is only 35° , which means quite a small motion of the head in order to look through the upper or lower section of the spectacles. This amount of movement may be smaller if the spectacles contain only two sections, as in Figure 9.

In order that road users may be protected from unscreened lights during the transition period when some vehicles are not fitted with anti-dazzle apparatus the spectacles shown in Figure 7 have the middle portion divided into two strips, one of clear glass or filter 65a and the other of opaque or dark neutral tinted filter 66, the top and bottom portions containing the usual blue-green and red filters 61 and 62. The spectacles shown in Figure 1 are adapted for use in the transition period on the two light system, the panel 65 being replaced by an opaque panel similar to 66.

Suitable spectacles for wear with the two light system are shown in Figure 9, in which the blue-green filters 61 occupy the upper portion and the red filter 62 the lower portion of the frame.

Two different types of blue-green filters may be incorporated in the device, as shown in Figure 6, one 64 lighter in tint than the other 63. The use of the lighter tinted filter enables the wearer to see red lights used as danger signals etc., by looking through the portion of the spectacle containing that filter.

It is obvious that the colour filters, instead of being mounted in spectacle frames of the standard type may be arranged in a single frame attached to head or to the head gear of the wearer, provided the plane of the filters is at the correct distance from the eye. The filters

may be arranged horizontally side by side, instead of vertically above one another, necessitating turning the head horizontally in order to obscure the lights of an incoming vehicle. The frame may also be designed as pince-nez or eye glasses.

The glass filters may be cemented to a piece of plain glass shaped to fit the spectacle frames as shown at 50, or when coloured gelatine films are used as filters they may be enclosed or cemented with suitable cement between two sheets of glass or celluloid for protection, as at 52. When cementing gelatine films between protective plates for use in the spectacles the films should be cut slightly smaller than the protective plates in order that the cement may form a protective coating round the edge, thus protecting the edges of the film against the entry of moisture and consequent swelling.

For a description and table of light filters suitable for use in the spectacles, reference may be had to the Specification of my co-pending Application No. 283,608 where such a table is given.

The filters combined with suitable lenses are shown at 51 and 53, for correcting the sight of the wearer when necessary.

To secure the filters in the frames the edges may be bevelled at an angle somewhat less than 90° as shown in Figure 4, and the rims of the frame made of V section, the interior angle being smaller than the angle of the glass edges, so gripping the glass firmly when the frame is tightened.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. An eye screening arrangement for personal wear adapted for use in the avoidance of dazzle by the lights of vehicles including a screen or panel transparent only to light substantially blue green and a screen or panel transparent only to light substantially red, mounted in a spectacle frame, characterised by the feature that the bridge of the frame is displaced back from the plane of the screen or panel substantially as described.

2. An eye screening arrangement as claimed in Claim 1 in which the frame supports an additional screen or panel opaque to light substantially as described.

3. An eye screening arrangement as claimed in Claim 2 in which the frame supports an additional screen or panel transparent to white light substantially as described.

4. An eye screening arrangement as claimed in Claim 1, 2 or 3 in which a spectacle frame carries duplicate sets of panels substantially as described.

5. An eye screening arrangement as claimed in Claim 1, 2 or 3 in which the screens or panels are combined with lenses when the sight of the wearer needs correction, substantially as described.

6. An eye screening arrangement as claimed in Claim 1, 2 or 3 in which two different kinds of blue-green screens are provided, one more transparent to extreme red light than the other to enable the wearer to see red danger signals and the like substantially as described.

Dated this 2nd day of June, 1927.

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